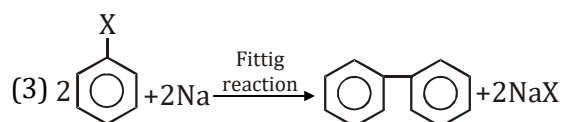
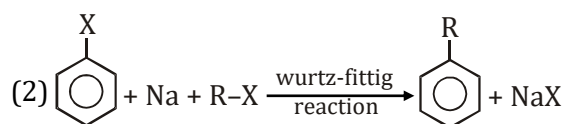
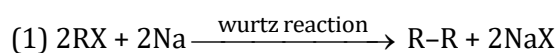


## EXERCISE-I (Conceptual Questions)

## Build Up Your Understanding

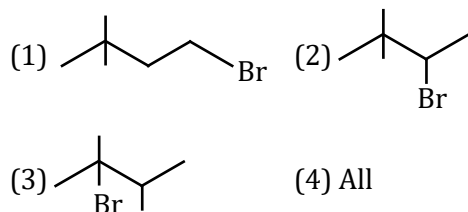
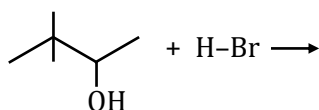
1. Which of the following is correct



(4) All of these

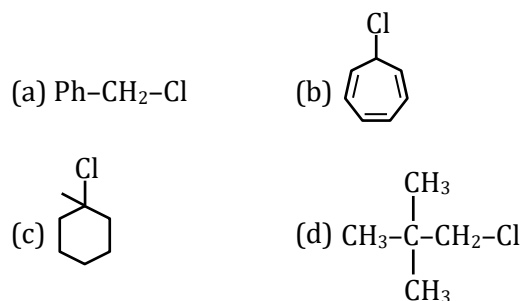
CHH024

2. Which halide is not obtained from following reaction?



CHH128

3. Arrange the following compounds in decreasing order of reactivity in  $S_N1$  reaction:-



(1) a > c > b > d

(2) c > d > b > a

(3) a > b > c > d

(4) b > a > c > d

CHH007

4. Which of the following undergoes nucleophilic substitution by  $S_N1$  mechanism at fastest rate:

(1) CH<sub>3</sub>-CH<sub>2</sub>-Cl

(2) 

(3) 

(4) 

CHH015

5. The oxidation of CHCl<sub>3</sub> by air, gives-

(1) HCOOH

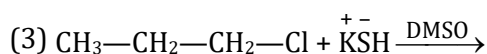
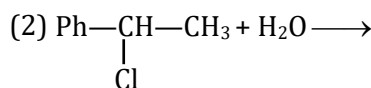
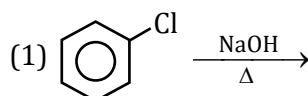
(2) CH<sub>3</sub>OH

(3) COCl<sub>2</sub>

(4) CCl<sub>4</sub>

CHH008

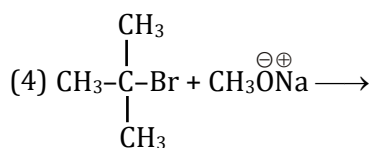
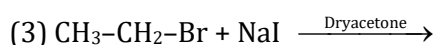
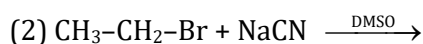
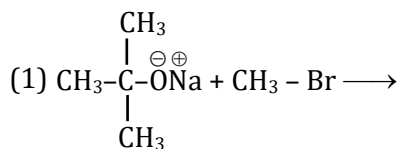
6. Which is not two step reaction?



(4) All of the above

CHH135

7. Which reaction gives elimination as a major product



CHH011

8. When a haloalkane with  $\beta$ -hydrogen is heated with alcoholic solution of KOH the product and the type of mechanism is-

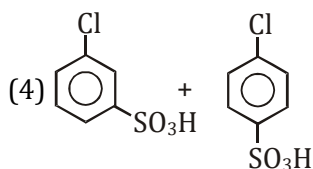
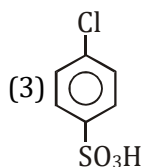
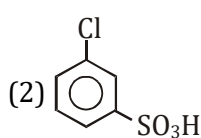
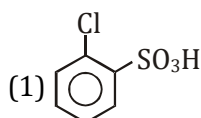
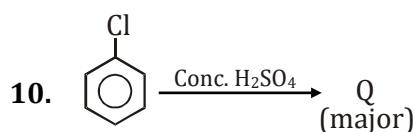
(1) Alcohol,  $S_N1$   
 (2) Alkene,  $\alpha$ -elimination  
 (3) Alcohol,  $S_N2$   
 (4) Alkene,  $\beta$ -elimination

CHH019

9. Hydrolysis of optically active 2-bromobutane gives-

(1) (d)-butan-2-ol      (2) (l)-butan-2-ol  
 (3) (dl)-butan-2-ol    (4) 2-butene

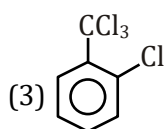
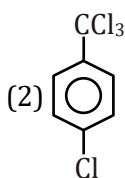
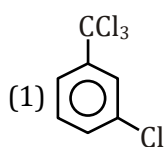
CHH018



CHH022



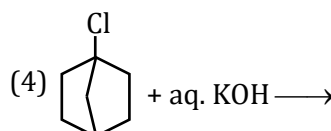
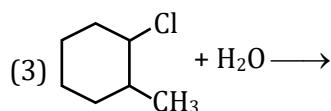
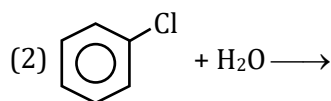
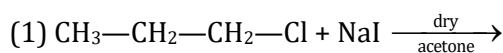
In the above reaction X is



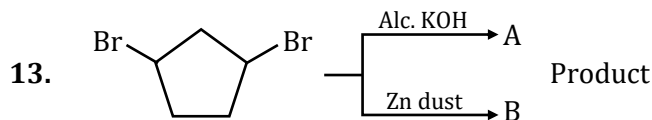
(4) None of these

CHH016

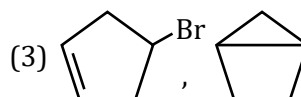
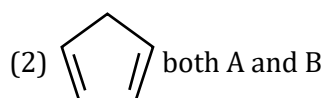
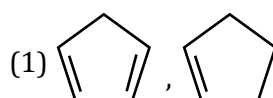
12. Which gives  $S_N2$  product as a major product ?



CHH133

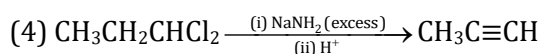
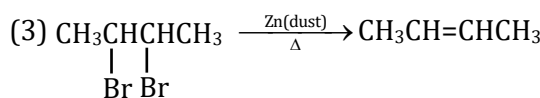
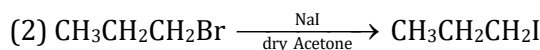
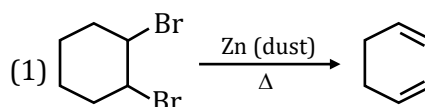


A and B respectively are



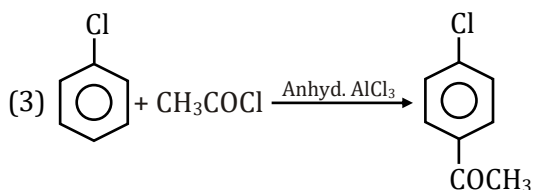
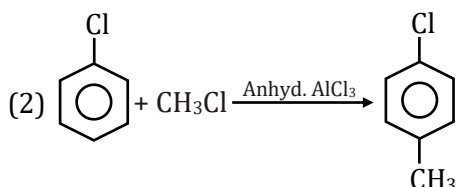
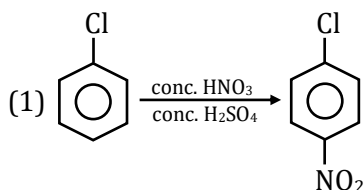
CHH132

14. Which reaction product is wrong (major) product



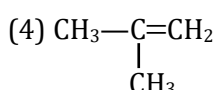
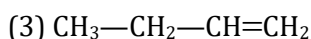
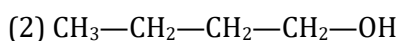
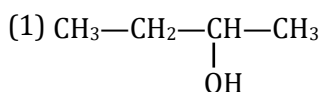
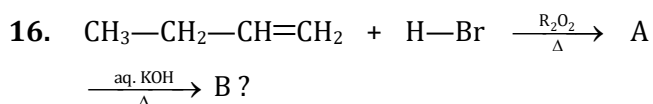
CHH014

15. The correct reaction is -



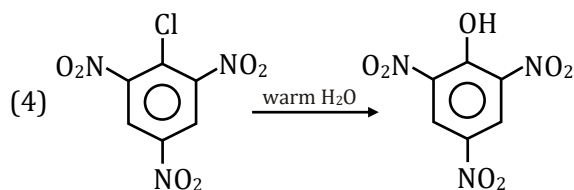
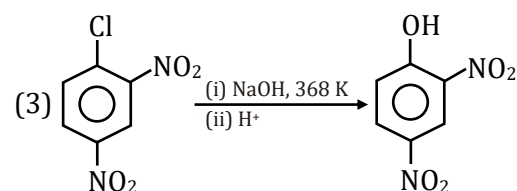
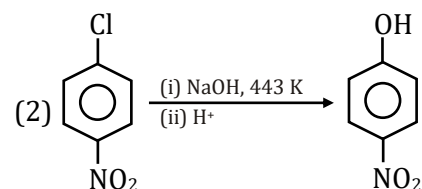
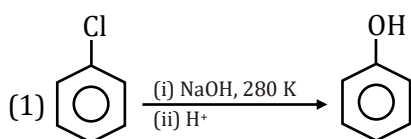
(4) All of these

CHH023



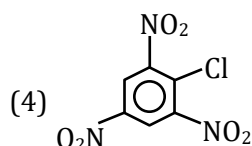
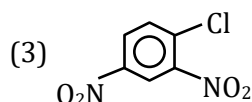
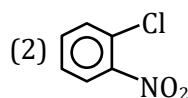
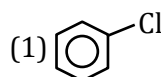
CHH131

17. The incorrect reaction is -

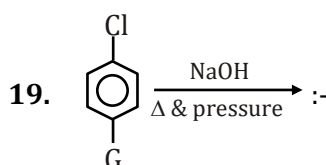


CHH021

18. Which of the following undergoes hydrolysis most easily



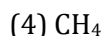
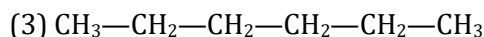
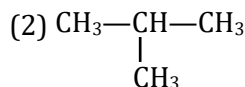
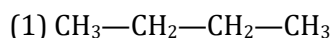
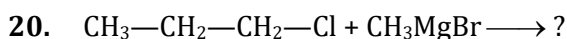
CHH009



Rate of reaction is maximum if G is :-

(1)  $-\text{OCH}_3$  (2)  $-\text{CH}_3$  (3)  $-\text{NO}_2$  (4)  $-\text{H}$

CHH017



CHH134

21. In  $\text{RMgX}$ , C-Mg bond is-

(1) Non polar covalent

(2) Polar covalent

(3) Ionic

(4) Coordinate

CHH020

**22.** When alkyl magnesium halide reacts with  $R'-NH_2$ , the product is

- (1)  $R-R$  (2)  $R-H$   
(3)  $R_2NH$  (4)  $R-X$

**CHH012**

**23.** Which of the following is used as insecticide

- (1) D.D.T. (2) Chloretoone  
(3)  $CHCl_3$  (4) All of them

**CHH010**

**24.** Incorrect match is-

- (1) Iodoform - Antiseptic  
(2) Pyrene - Fire extinguisher  
(3) Freon 12 - aerosol propellants  
(4) DDT - Fat insoluble

**CHH025**

**EXERCISE-I (Conceptual Questions)**

**ANSWER KEY**

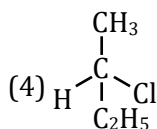
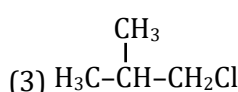
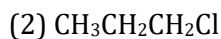
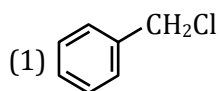
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|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Answer   | 4  | 1  | 4  | 3  | 3  | 3  | 4  | 4  | 3  | 3  | 1  | 1  | 4  | 1  | 4  |
| Question | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |    |    |    |    |    |    |
| Answer   | 3  | 1  | 4  | 3  | 1  | 2  | 2  | 1  | 4  |    |    |    |    |    |    |

## EXERCISE-II (Previous Year Questions)

## AIPMT/NEET

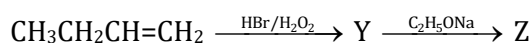
## AIPMT 2014

1. Which of the following compounds will undergo racemisation when hydrolysed



CHH037

2. Identify Z in the sequence of reactions:

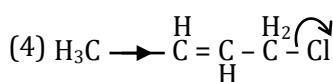
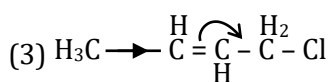
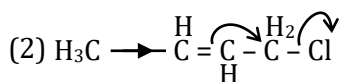
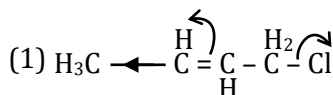


- (1)  $\text{CH}_3-(\text{CH}_2)_3-\text{O}-\text{CH}_2\text{CH}_3$   
 (2)  $(\text{CH}_3)_2\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_3$   
 (3)  $\text{CH}_3(\text{CH}_2)_4-\text{O}-\text{CH}_3$   
 (4)  $\text{CH}_3\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O}-\text{CH}_2\text{CH}_3$

CHH038

## AIPMT 2015

3. Which of the following is the most correct electron displacement for a nucleophilic reaction to take place?



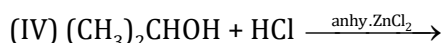
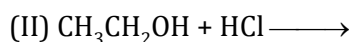
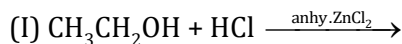
CHH039

4. In an  $\text{S}_{\text{N}}1$  reaction on chiral centres, there is :

- (1) 100% retention  
 (2) 100% inversion  
 (3) 100% racemization  
 (4) Inversion more than retention leading to partial racemization

CHH040

5. Which of the following reaction(s) can be used for the preparation of alkyl halides ?

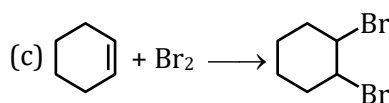
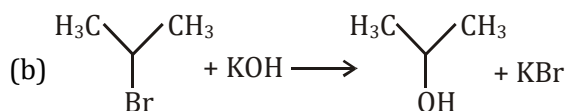
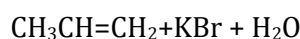
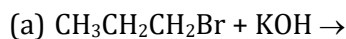


- (1) (IV) only  
 (2) (III) and (IV) only  
 (3) (I), (III) and (IV) only  
 (4) (I) and (II) only

CHH041

## NEET-II 2016

6. For the following reactions :-

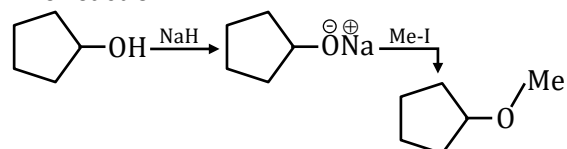


Which of the following statement is correct ?

- (1) (a) and (b) are elimination reaction and (c) is addition reaction  
 (2) (a) is elimination, (b) is substitution and (c) is addition reaction  
 (3) (a) is elimination, (b) and (c) are substitution reactions  
 (4) (a) is substitution, (b) and (c) are addition reaction

CHH042

7. The reaction

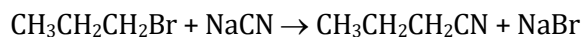


Can be classified as :-

- (1) Williamson ether synthesis reaction  
 (2) Alcohol formation reaction  
 (3) Dehydration reaction  
 (4) Williamson alcohol synthesis reaction

CHH043

8. Consider the reaction



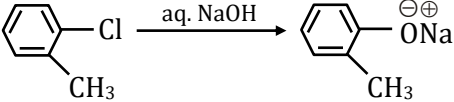
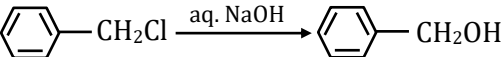
This reaction will be the fastest in

- (1) N, N'-dimethylformamide (DMF)
- (2) Water
- (3) Ethanol
- (4) Methanol

CHH044

NEET(UG) 2019 (ODISHA)

9. The hydrolysis reaction that takes place at the slowest rate, among the following is :-

- (1) 
- (2)  $\text{H}_3\text{C}-\text{CH}_2-\text{Cl} \xrightarrow{\text{aq. NaOH}} \text{H}_3\text{C}-\text{CH}_2-\text{OH}$
- (3)  $\text{H}_2\text{C}=\text{CH}-\text{CH}_2\text{Cl} \xrightarrow[\text{NaOH}]{\text{aq.}} \text{H}_2\text{C}=\text{CH}-\text{CH}_2\text{OH}$
- (4) 

CHH045

NEET(UG) 2020

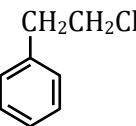
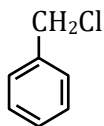
10. Elimination reaction of 2-Bromopentane to form pent-2-ene is:

- (a)  $\beta$ -Elimination reaction
  - (b) Follow Zaitsev rule
  - (c) Dehydrohalogenation reaction
  - (d) Dehydration reaction
- (1) (a), (b), (d)
  - (2) (a), (b), (c)
  - (3) (a), (c), (d)
  - (4) (b), (c), (d)

CHH046

NEET(UG) 2020 (Covid-19)

11. Which of the following will NOT undergo  $\text{S}_{\text{N}}1$  reaction with  $\text{OH}^-$ ?

- (1)  $\text{CH}_2=\text{CH}-\text{CH}_2\text{Cl}$
- (2)  $(\text{CH}_3)_3\text{CCl}$
- (3) 
- (4) 

CHH047

NEET(UG) 2021

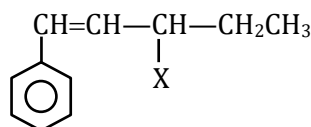
12. The correct sequence of bond enthalpy of 'C-X' bond is

- (1)  $\text{CH}_3-\text{F} < \text{CH}_3-\text{Cl} < \text{CH}_3-\text{Br} < \text{CH}_3-\text{I}$
- (2)  $\text{CH}_3-\text{F} > \text{CH}_3-\text{Cl} > \text{CH}_3-\text{Br} > \text{CH}_3-\text{I}$
- (3)  $\text{CH}_3-\text{F} < \text{CH}_3-\text{Cl} > \text{CH}_3-\text{Br} > \text{CH}_3-\text{I}$
- (4)  $\text{CH}_3-\text{Cl} > \text{CH}_3-\text{F} > \text{CH}_3-\text{Br} > \text{CH}_3-\text{I}$

CHH048

NEET(UG) 2023

13. The given compound

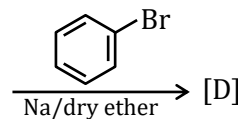
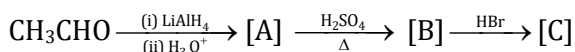


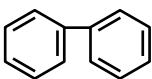
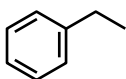
is an example of \_\_\_\_.

- (1) aryl halide
- (2) allylic halide
- (3) vinylic halide
- (4) benzylic halide

CHH136

14. Identify the final product [D] obtained in the following sequence of reactions.



- (1) 
- (2)  $\text{C}_4\text{H}_{10}$
- (3)  $\text{HC}\equiv\text{C}^-\text{Na}^+$
- (4) 

CHH137

15. Which amongst the following reactions of alkyl halides produces isonitrile as a major product?

- (A)  $\text{R}-\text{X} + \text{HCN} \rightarrow$
- (B)  $\text{R}-\text{X} + \text{AgCN} \rightarrow$
- (C)  $\text{R}-\text{X} + \text{KCN} \rightarrow$
- (D)  $\text{R}-\text{X} + \text{NaCN} \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{H}_2\text{O}}$

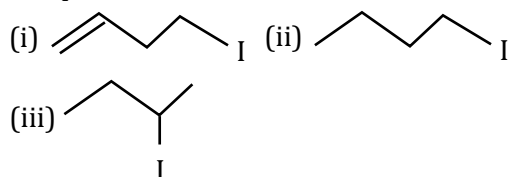
Choose the **most appropriate** answer from the options given below :

- (1) (D) only
- (2) (C) and (D) only
- (3) (B) only
- (4) (A) and (B) only

CHH138

# Haloalkanes and Haloarenes

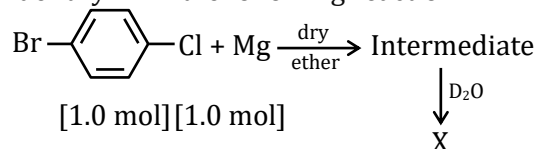
16. The correct order for the rate of  $\alpha$ ,  $\beta$ -dehydrohalogenation for the following compounds is \_\_\_\_.

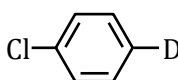
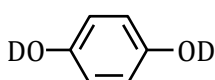
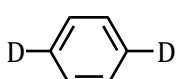
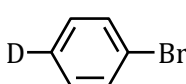


- (1) (i) < (ii) < (iii)  
 (2) (ii) < (i) < (iii)  
 (3) (iii) < (ii) < (i)  
 (4) (ii) < (iii) < (i)

CHH139

17. Identify 'X' in the following reaction.

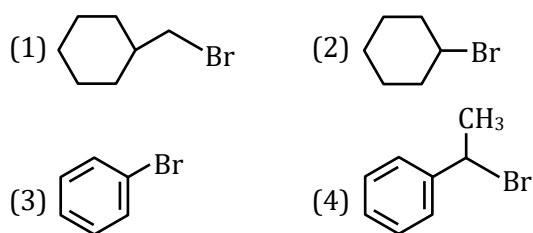


- (1)   
 (2)   
 (3)   
 (4) 

CHH140

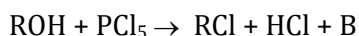
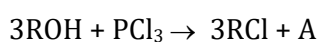
## NEET(UG) 2024

18. The compound that will undergo  $S_N1$  reaction with the fastest rate is :



CHH141

19. The products A and B obtained in the following reactions, respectively, are



- (1)  $POCl_3$  and  $H_3PO_3$  (2)  $POCl_3$  and  $H_3PO_4$   
 (3)  $H_3PO_4$  and  $POCl_3$  (4)  $H_3PO_3$  and  $POCl_3$

CHH142

## EXERCISE-II (Previous Year Questions)

## ANSWER KEY

| Question | 1  | 2  | 3  | 4  | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----------|----|----|----|----|---|---|---|---|---|----|----|----|----|----|----|
| Answer   | 4  | 1  | 2  | 4  | 3 | 2 | 1 | 1 | 1 | 2  | 3  | 2  | 2  | 4  | 3  |
| Question | 16 | 17 | 18 | 19 |   |   |   |   |   |    |    |    |    |    |    |
| Answer   | 4  | 1  | 4  | 4  |   |   |   |   |   |    |    |    |    |    |    |

### EXERCISE-III (Analytical Questions)

## Master Your Understanding

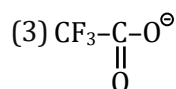
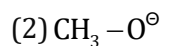
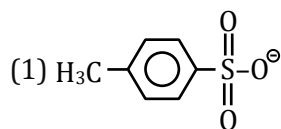
1. Consider the following statements-
- (A) In allylic halides halogen atom is bonded to an  $sp^3$  carbon adjacent to  $C=C$
  - (B) In benzylic halides halogen atom is bonded to  $sp^3$  carbon attached to an aromatic ring
  - (C) In vinylic halides halogen atom is bonded to a  $sp^2$  carbon of a  $C=C$
  - (D) In aryl halides halogen atom is directly bonded to a  $sp^2$  carbon of an aromatic ring

Which statement(s) is/are correct

- (1) Only A, B, C                      (2) Only A, C  
(3) Only A, C, D                      (4) All

CHH057

2. Which of the following has maximum nucleophilicity :-



# CHH100

3. Which halide ion is the best nucleophile in DMF -

- (1)  $\text{F}^\ominus$                       (2)  $\text{Cl}^\ominus$   
(3)  $\text{Br}^\ominus$                       (4)  $\text{I}^\ominus$

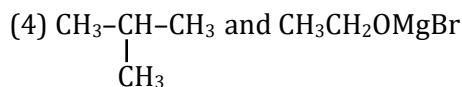
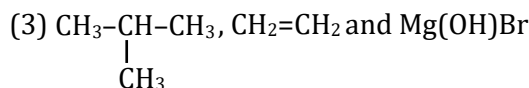
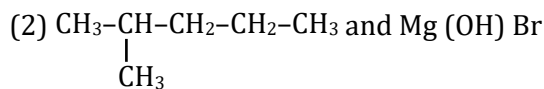
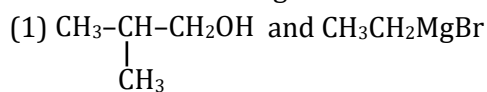
CHH062

4. The product in the following reaction is  
 $\text{Ph-Cl} + \text{Fe} / \text{Br}_2 \longrightarrow \text{Product}$

- (1) o-bromo chloro benzene
- (2) p-bromo chloro benzene
- (3) Both the above
- (4) 2,4,6-tribromo chloro benzene

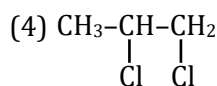
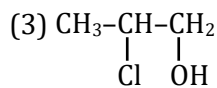
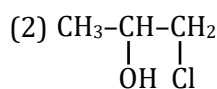
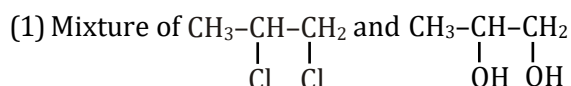
CHH052

5. Isobutyl magnesium bromide with dry ether and absolute alcohol gives



CHH053

6. Identify 'Z' in the following reaction series,
- $$\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} \xrightarrow{\text{aq. NaOH}} (\text{X}) \xrightarrow[\text{Heat}]{\text{Al}_2\text{O}_3} (\text{Y})$$
- $$\xrightarrow{\text{Cl}_2/\text{H}_2\text{O}} (\text{Z})$$



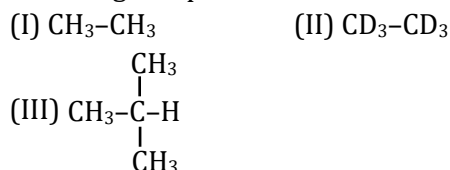
CHH054

7. Which alkane gives 1-chloro-2,2-dimethylpropane on monochlorination-

- (1) Isopentane
- (2) Isobutane
- (3) Neopentane
- (4) 2,3-dimethyl butane

CHH058

- 8.** Correct order of rate of photo bromination for following compounds-



- (1)  $II < I < III$                       (2)  $I < II < III$   
(3)  $III < I < II$                       (4)  $II < III < I$

CHH060



Number of possible monochloro derivatives excluding stereo isomers is/are -

- (1) 4      (2) 5      (3) 3      (4) 6

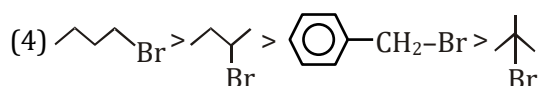
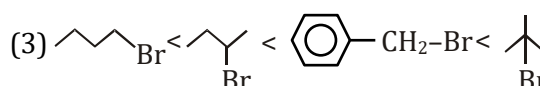
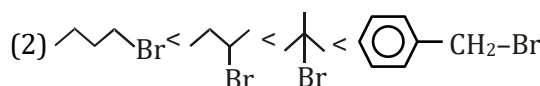
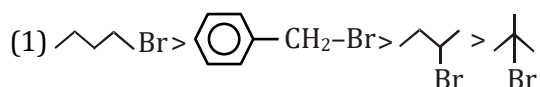
CHH061

10. In  $S_N1$  the first step involves the formation of

- (1) Free radical      (2) Carbanion  
(3) Carbocation      (4) Final product

CHH072

11. The correct reactivity order for  $S_N1$  reactions is-



CHH068

12.  $S_N1$  reaction on an optically active substrate having only one chiral centre which is also reaction centre, gives :-

- (1) Retention in configuration  
(2) Inversion in configuration  
(3) Partially racemised product  
(4) Complete racemised product

CHH083

13. Compound is most reactive towards NaOH.

- (1)  $\text{CH}_3\text{Cl}$       (2)  $\text{CH}_2=\text{CHCl}$   
(3)  $\text{C}_6\text{H}_5\text{Cl}$       (4)  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$

CHH081

14. Most stable carbocation formed from  $(\text{CH}_3)_3\text{C-Br}$ ,  $(\text{C}_6\text{H}_5)_3\text{CBr}$ ,  $(\text{C}_6\text{H}_5)_2\text{CHBr}$  and  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$  would be

- (1)  $\text{C}_6\text{H}_5\text{CH}_2^+$       (2)  $(\text{CH}_3)_3\text{C}^+$   
(3)  $(\text{C}_6\text{H}_5)_3\text{C}^+$       (4)  $(\text{C}_6\text{H}_5)_2\text{CH}^+$

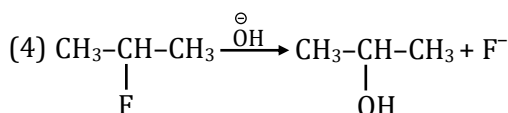
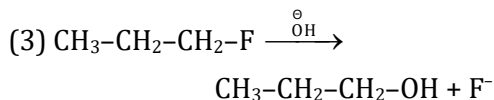
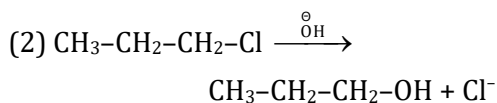
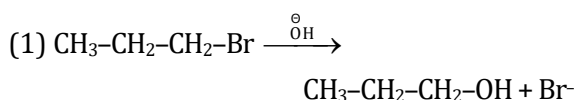
CHH082

15. The hydrolysis of alkyl halides by aqueous NaOH is best termed as

- (1) Electrophilic substitution reaction  
(2) Electrophilic addition reaction  
(3) Nucleophilic addition reaction  
(4) Nucleophilic substitution reaction

CHH084

16. Which of the following  $S_N2$  reaction is the slowest-



CHH063

17. Rate of  $S_N2$  reaction will be maximum in which of the following solvent -

- (1)  $\text{H}_2\text{O}$       (2)  $\text{CH}_3\text{OH}$



CHH064

18. Which of the following is most reactive for  $S_N2$  reactions.

- (1)  $(\text{C}_6\text{H}_5)_2\text{C}(\text{CH}_3)\text{Br}$       (2)  $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$   
(3)  $(\text{C}_6\text{H}_5)_3\text{CBr}$       (4)  $\text{C}_6\text{H}_5\text{CH}_2\text{Br}$

CHH069

19. The reaction,  $\text{CH}_3\text{Br} + \text{OH}^- \longrightarrow \text{CH}_3\text{OH} + \text{Br}^-$  obeys the mechanism

- (1)  $S_N1$       (2)  $S_N2$       (3)  $E_1$       (4)  $E_2$

CHH077

20. Butanenitrile may be prepared by heating

- (1) Propyl alcohol with KCN  
(2) Butyl alcohol with KCN  
(3) Butyl chloride with KCN  
(4) Propyl chloride with KCN

CHH078

21. The given reaction is an example of  
 $\text{C}_2\text{H}_5\text{Br} + \text{KCN}(\text{aq.}) \longrightarrow \text{C}_2\text{H}_5\text{CN} + \text{KBr}$

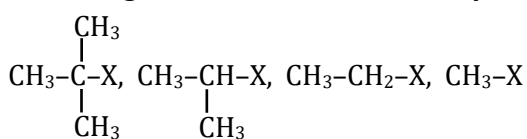
- (1) Elimination
- (2) Nucleophilic substitution
- (3) Electrophilic substitution
- (4) Redox change

CHH079

22. The least reactive chlorine is present in  
 (1) Methyl chloride (2) Allyl chloride  
 (3) Ethyl chloride (4) Vinyl chloride

CHH086

23. Arrange the following compounds in the increasing order of their  $\text{S}_{\text{N}}2$  reactivity?



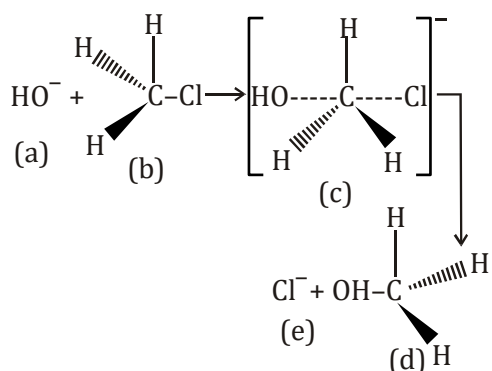
- (a) (b) (c) (d)
- (1) (a) < (b) < (c) < (d)
  - (2) (a) < (c) < (d) < (b)
  - (3) (d) < (c) < (b) < (a)
  - (4) (b) < (d) < (c) < (a)

CHH087

24. The Williamson synthesis involves :-  
 (1) A nucleophilic addition  
 (2) An electrophilic substitution  
 (3)  $\text{S}_{\text{N}}2$  displacement  
 (4)  $\text{S}_{\text{N}}1$  displacement

CHH090

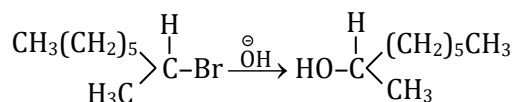
25. Which of the following statement is correct for  $\text{S}_{\text{N}}2$  mechanism



- (1) In (c) carbon atom is  $\text{sp}^3$  hybridized
- (2) In (c) carbon atom is  $\text{sp}^2$  hybridised
- (3) (a) and (e) are electrophiles
- (4) (c) is more stable than (d)

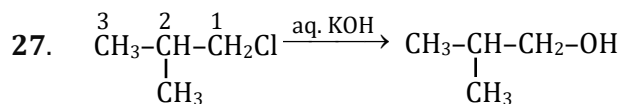
CHH102

26. Following reaction is



- (1)  $\text{E}_1$  (2)  $\text{S}_{\text{N}}1$  (3)  $\text{E}_2$  (4)  $\text{S}_{\text{N}}2$

CHH103



In the above reaction the attack of a nucleophile would be from which side

- (1) On the front side of Cl of  $\text{C}_1$  carbon
- (2) On  $\text{C}_2$  carbon
- (3) On the rear side of Cl of  $\text{C}_1$  carbon
- (4) On  $\text{C}_3$  carbon

CHH104

28. Which of the following ether can not be prepared by Williamson's method :-

- (1) Di-tert.butyl ether
- (2) Methyl-tert.butyl ether
- (3) Anisole
- (4) Both (1) and (2)

CHH105

29. With conc. HBr ethyl phenyl ether yields :-

- (1) Phenol and ethyl bromide.
- (2) Bromobenzene and ethanol
- (3) Phenol and ethane
- (4) Bromobenzene and ethane

CHH092

30. Reaction of sodium ethoxide and ethyl iodide will give :-

- (1) Ether (2) Ethyl alcohol
- (3) Acetaldehyde (4) Acetic acid

CHH085

31. The reaction of ethyl iodide with sodium ethoxide is

- (1) An electrophilic substitution reaction
- (2) A nucleophilic addition reaction
- (3) A nucleophilic substitution reaction
- (4) A free radical substitution reaction

CHH089

# Haloalkanes and Haloarenes

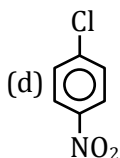
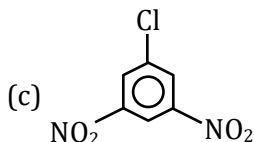
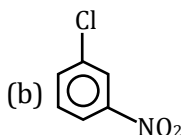
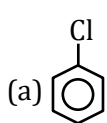
32. In the Williamson synthesis of ethers given by the general equation –

$R-X + R'ONa \longrightarrow R-O-R'$  the yield from R-X follows the sequence :-

- (1)  $CH_3X > 1^\circ > 2^\circ > 3^\circ$
- (2)  $CH_3X < 1^\circ < 2^\circ < 3^\circ$
- (3)  $CH_3X < 1^\circ < 2^\circ > 3^\circ$
- (4)  $CH_3X > 1^\circ < 2^\circ < 3^\circ$

CHH091

33. Arrange the following compound in increasing order of reactivity towards aromatic nucleophilic substitution reaction.



- (1)  $c > d > b > a$
- (2)  $c > b > a > d$
- (3)  $d > c > b > a$
- (4)  $a > d > b > c$

CHH055

34. To form alkane isonitrile, alkyl halide is reacted with:

- (1) KCN
- (2) AgCN
- (3) NaCN
- (4)  $NH_4CN$

CHH073

35. Alkyl fluorides are synthesised by

- (1) Finkelstein reaction
- (2) Swart reaction
- (3) Kolbe reaction
- (4) Wurtz reaction

CHH074

36. The products of reaction of alcoholic silver nitrite with ethyl bromide are

- (1) Ethane
- (2) Ethene
- (3) Ethyl alcohol
- (4) Nitro ethane

CHH075

37. The unimolecular elimination involves formation of

- (1) A free radical
- (2) A carbanion
- (3) A carbocation
- (4) A biradical

CHH094

38. Major product of the reaction :-

$(CH_3)_3C-Cl + C_2H_5ONa \longrightarrow$  would be :-

- (1)  $(CH_3)_2C-OC_2H_5$
- (2)  $(CH_3)_3C-C_2H_5$
- (3)  $(CH_3)_2C=CH_2$
- (4)  $CH_3-CH=CH-C_2H_5$

CHH106

39. In following two columns :

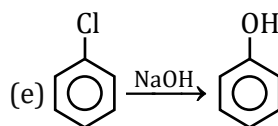
**Column-I**

(a)  $CH_3-CH_2-Br + HS^- \rightarrow CH_3-CH_2-SH + Br^-$

(b)  $(CH_3)_2C=CH_2 + HOCl \rightarrow (CH_3)_2\overset{OH}{\underset{|}{C}}-CH_2-Cl$

(c)  $CH_3-CH_2-Br + ^-OH \rightarrow CH_2=CH_2 + H_2O + Br^-$

(d)  $(CH_3)_3C-CH_2-OH + H-Br \rightarrow (CH_3)_2CBrCH_2-CH_3 + H_2O$



**Column-II**

- (1) Nucleophilic substitution
- (2) Elimination
- (3) Electrophilic substitution
- (4) Electrophilic addition
- (5) Rearrangement reaction

- (1) a, d, e  $\rightarrow$  1, b  $\rightarrow$  4, c  $\rightarrow$  2
- (2) a, d, e  $\rightarrow$  1, b  $\rightarrow$  4, c  $\rightarrow$  3
- (3) a, e  $\rightarrow$  1, b  $\rightarrow$  4, c  $\rightarrow$  2, d  $\rightarrow$  5
- (4) a, c  $\rightarrow$  1, b  $\rightarrow$  4, e  $\rightarrow$  3, d  $\rightarrow$  5

CHH107

40. Match the column :-

| Column-I<br>(Conversion) |                                              | Column-II<br>(Reagent) |                         |
|--------------------------|----------------------------------------------|------------------------|-------------------------|
| (a)                      | 1-Butene $\rightarrow$ 2-Butanol             | (p)                    | $BH_3/THF$ , $CH_3COOH$ |
| (b)                      | 1-Butene $\rightarrow$ 1-Butanol             | (q)                    | HBr, aq KOH             |
| (c)                      | Propene $\rightarrow$ Propane                | (r)                    | Alc.KOH, HBr/ $R_2O_2$  |
| (d)                      | 2-Bromopropane $\rightarrow$ 1-Bromo propane | (s)                    | HBr/ $H_2O_2$ , aq KOH  |

- (1) a - q, b - p, c - s, d - r
- (2) a - p, b - s, c - q, d - r
- (3) a - q, b - r, c - s, d - p
- (4) a - q, b - s, c - p, d - r

CHH108

41. The reactivity of alkyl halides in  $E_2$  elimination reactions follows the order

- (1)  $R-I < R-Br < R-Cl < R-F$   
 (2)  $R-F < R-Cl < R-Br < R-I$   
 (3)  $R-I > R-Cl > R-Br < R-F$   
 (4)  $R-I < R-Br < R-F < R-Cl$

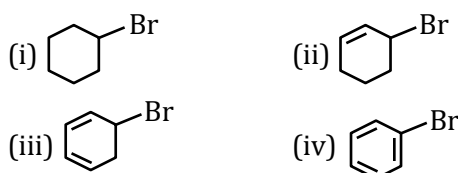
CHH093

42. Which of the following alkyl halides gives a mixture of alkenes on dehydrohalogenation

- (1) n-Propyl halide (2) Isopropyl halide  
 (3) s-Butyl bromide (4) t-Butyl bromide

CHH095

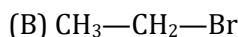
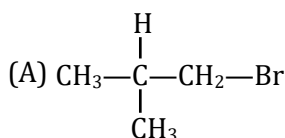
43. Arrange the following in order of ease of dehydrohalogenation:



- (1) (iii) > (iv) > (ii) > (i)  
 (2) (iii) > (ii) > (i) > (iv)  
 (3) (ii) > (iii) > (i) > (iv)  
 (4) (i) > (ii) > (iii) > (iv)

CHH051

44. Arrange the following alkyl halides in decreasing order of the rate of elimination reaction with alcoholic KOH.



- (1)  $A > B > C$  (2)  $C > B > A$   
 (3)  $B > C > A$  (4)  $A > C > B$

CHH098

45. Alkaline hydrolysis of 2,2-Dichloropropane gives

- (1) Acetone (2) 2,2-Propanediol  
 (3) Propane (4) Propan-2-ol

CHH101

46. Which of the following has highest dipole moment:

- (1)  $\text{CH}_3\text{Cl}$  (2)  $\text{CH}_3\text{F}$  (3)  $\text{CH}_3\text{Br}$  (4)  $\text{CH}_3\text{I}$

CHH049

47. Chloroform when treated with benzene in presence of anhydrous  $\text{AlCl}_3$ , the product formed is

- (1) Chlorobenzene  
 (2) Toluene  
 (3) Mixture of ortho and para chlorotoluene  
 (4) Triphenyl methane

CHH056

### EXERCISE-III (Analytical Questions)

### ANSWER KEY

| Question | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Answer   | 4  | 2  | 1  | 3  | 4  | 2  | 3  | 1  | 2  | 3  | 2  | 3  | 4  | 3  | 4  |
| Question | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Answer   | 4  | 4  | 4  | 2  | 4  | 2  | 4  | 1  | 3  | 2  | 4  | 3  | 1  | 1  | 1  |
| Question | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| Answer   | 3  | 1  | 3  | 2  | 2  | 4  | 3  | 3  | 1  | 4  | 2  | 3  | 2  | 4  | 1  |
| Question | 46 | 47 |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Answer   | 1  | 4  |    |    |    |    |    |    |    |    |    |    |    |    |    |